they could obtain a good store of honey with very little trouble, and would have brought a lot back with them."

Later on he says that he has come to the conclusion that what sometimes "appeared like affection was invariably dictated by selfishness."

Now, is the example given by Sir John of the want of communicative power afforded by the bee sufficient, or, indeed, any evidence of the fact? Is it not rather an excellent instance of the intense selfishness which governs the bee, in common with all other creatures, in its aim to prolong the life of the individual without a care for that of its fellows?

Again, Sir John says:—

"It was not altogether a selfish feeling which induced bees to show such eagerness to gather honey, for what they took to the hive was for the good of the whole colony."

This act seems to me to be in no way inconsistent with absolutely selfish motives. Bees find that there is strength in union, and that the winter months, which would kill them if left alone, they can survive by adopting principles of co-operation. The stronger the individual bee the more likely is she to derive benefit from the partnership, and a hive may, in fact, be regarded as a "tontine" association.

Lastly, when Sir John Lubbock says—"With regard to swarming bees by beating the warming pans, he thought there was nothing in it, but that it was an idea which had got possession of some people in the same way as many savage tribes believed that by making hideous noises during the eclipse of the moon they could frighten away the evil spirit which held her"—he would appear to have overlooked the fact that this is a practice arising from the peculiar ownership, of which, under English law, bees are the subject.

"Bees are *feræ naturæ*, but when hived and reclaimed a man may have a qualified property in them, by the law of nature as well as by the civil law" (Puff. c. iv. c. b. s. 5., Inst. 11, l. 14.) "Though a swarm," says Blackstone, "lights upon my tree, I have no more property in them till I have hived them than I have in the birds which make their nests thereon, and therefore, if another hives them he shall be the proprietor; but a swarm which flies from and out of my hive are mine so long as I can keep them in sight and have power to pursue them, and in these circumstances no one else is entitled to take them."

Hence the origin amongst villagers of pursuing a swarm with the clamour of pans and fire-irons; not for the benefit of the bee, *quâ* bee, but in order to inform others that the followers are the possessors of the swarm.

It is easy to imagine that now some villagers may (confounding cause and effect) assert that the sound assists the operations of the bees or those of their hiver.

ALFRED GEORGE RENSHAW

Doctors' Commons, London

On the Value of the so-called Chameleon Barometer as an Hygrometer

A PIECE of filter paper soaked in a strong solution of cobaltous chloride ($CoCl_2$) is blue when dry, and red when moist; and I have found it very sensitive to slight changes in the quantity of moisture in the atmosphere, being more delicate than the thermometers I used.

The paper was suspended in a room, on the wall facing a south window, which was kept open during the day. By the side of the paper was hung a wet and dry bulb thermometer, reading to 2° Fahr., and observations were recorded three or four times a day for nearly a year.

I adjoin a few of the readings taken, as from their regularity it is unnecessary to give them all. The scale of change of colour was reckoned from 0 to 10, from red to blue.

It will be observed that for a difference of 13° between the two thermometers, the paper is quite blue, and it becomes red at a difference of from 1° to 3°. There is, of course, a limit to the change of colour, as when blue it cannot be any more blue, although the air should lose moisture. However, on the hottest day last summer it stood at 10, or maximum blue, for a difference of 13° between the thermometers, and when this difference fell to 12° the paper showed a decided change in tint.

It appears that the *actual* temperature has nothing to do with the colour of the paper, as it registers the same tint for the same difference between the two thermometers (with very slight variations) whether the day be hot or cold.

I think that such a paper is a handy addition to the thermometers, as you can see at a glance whether the air is wet or dry.

DATE.	Dry-bulb Thermometer.	Wet-bulb Thermometer.	Difference.	Colour of Paper. 0 — 10.	REMARKS.
July 8, 1874.					
1.30 P.M.	72	60	12	9	
5.30 ,,	74	61	13	10	Very hot day.
12.30 ,,	70	59	11	8·5	
July 10.					
9.30 A.M.	74·5	65	9·5	8	Much hotter than the 8th, and yet paper not so blue.
1.30 P.M.	77	67	10	7	
5.30 ,,	79	67	12	9	
Sept. 30.					
1.30 P.M.	62	56	6	3	Barometer falling for rain.
8.0 ,,	64	61	3	1	
Oct. 1.					
9.30 A.M.	62	58	4	0·5	Rained in night.
10.30 P.M.	63	59	4	1	Barometer rising.
Oct. 2.					
1.30 P.M.	59	55	4	0·5	Bar. fallen, showery.
6.40 ,,	58	53	5	1	Bar. steady, cleared up. These two days show the paper to be more sensitive than the thermometers.
Oct. 23.					
1.30 P.M.	52	48	4	1	Wind N.
6.30 ,,	55	54	1	0	Wind W.
Dec. 3.					
10 A.M.	43	40	3	2	Sharp frost.

Rugby, Jan. 16 A. PERCY SMITH

Phosphorus and Carbon Disulphide

KNOWING the highly refractive power of phosphorus, and also of carbon disulphide, it occurred to me that a solution of the former in the latter might yield a liquid more highly refractive than any I had yet met with.

I could not succeed in making a solution so saturated that when another piece of phosphorus was put in it should not be affected. I made, however, an exceedingly concentrated solution. This solution had to be filtered. The clear liquid had the property of continually precipitating phosphorus, in what I believe was the red form. The solubility of phosphorus in carbon disulphide is very remarkable. Has it a definable limit? or is phosphorus, at ordinary temperatures, really a very viscous fluid?

Also I made a perfectly saturated solution of sulphur in carbon disulphide. This was much more easily accomplished, and it showed no tendency to change from its condition of a clear light-yellow coloured fluid.

A hollow glass prism, angle 60° was used, and kept in position of minimum deviation for sodium light for each substance.

Values of Refractive Indices are given in the following table:—

Refractive Indices.

	Lithium *a*.	Hydrogen C.	Sodium D.	Hydrogen F.	Hydrogen G.
P in CS_2 at 51½° F.	1·7648	1·7749	1·7780	1·8136	—
S in CS_2 at 51½° F.	—	1·6840	1·6890	1·7254	—
CS_2 alone at 55° F.	—	—	1·6321	—	—
Flint glass at 51½° F.	—	1·6193	1·6244	1·6370	1·6470

The hydrogen lines were obtained by a Geissler tube.

I do not give the measurements as more than near approximations, as I had no time to repeat them. They were made in the Cavendish Laboratory at Cambridge.

Harrogate, Jan. 21 CHAS. T. WHITMELL

The Micrographical Dictionary—Pollen Grains

IT is a pity that Mr. W. G. Smith (NATURE, vol. xi. p. 286) did not take the trouble to satisfy himself of the truth of Dr. Hugo

© 1875 Nature Publishing Group

Mohl's statement, that the pollen of *Mimulus moschatus* and *Mimulus luteus* takes several forms, before writing his letter. I may inform him that the figure—in the "One Thousand Objects"—to which he alludes was *not* copied from the "Micrographical Dictionary," as he states. Had Mr. Smith first taken the pains to read what so excellent an authority as Dr. Hugo Mohl has written on pollen, and seen his figures, perhaps his remarks would have taken a different form. He may have observed but one form or one aspect of the pollen grains of *Mimulus* differing from the figures criticised, yet botanists will hesitate to accept his interpretation in opposition to so excellent a physiologist as Dr. H. Mohl, on the faith of his *ad captandum* observations.

M. C. COOKE

OUR ASTRONOMICAL COLUMN

VARIABLE STARS.—Amongst the stars which deserve attention on account of probable variability, the following may be mentioned; we take them in order of right ascension.

1. λ Eridani, first suspected by the late Capt. Gilliss, of the U.S. Naval Observatory, Washington. It has been variously estimated between mag. 4 (Lalande, Argelander, Heis) and 6 (Gilliss, Santini).

2. 33 Herculis. The variation of this star hardly admits of doubt. It is called 6 mag. by Flamsteed, Bradley, Piazzi (who observed it nine times), Taylor, and Robinson, and is so entered on Wolfers' Chart; Lalande calls it 7, and this is the magnitude assigned in the Radcliffe observations 1867-68. Bessel and Argelander (in the "Durchmusterung") considered it only 8; Gilliss also drew attention to this star.

3. Lalande 31384. In the "Histoire Céleste," p. 291, this star is called 6½. Sir John Herschel, in his third series of observations with a 20-ft. reflecting telescope, estimated it 5, and remarked that it is not in Piazzi. Bessel and Santini, who has four observations, call it 7; it is 5·5 in the "Durchmusterung," and 6 on Bremicker's Chart.

4. 41 ι Aquilæ looks suspicious; D'Agelet has four observations, 6, 4·5, 6, 6; Lalande two, 3½, 4; it is 5 in Piazzi, 4·2 in "Durchmusterung."

5. Piazzi XXI. 21. D'Agelet, who observed this star twice, calls it 8 on one occasion, and 9·10 on the other. It is 8 in Piazzi, 6 and 6½ in Lalande, 9 in Bessel, and 7·5 in Argelander (Durch.)

6. 17 ι Andromedæ. This star has been variously estimated between 3·4 and 7. Flamsteed says 4, Bradley 7, D'Agelet 3·4 in 1783, and 6 in 1784; Lalande twice calls it 5, and once 4; Piazzi, who has ten observations, 7; it is 4 in the Atlases of Argelander and Heis, and 3·9 in the first Radcliffe catalogue. Bradley and Piazzi compared with the Oxford catalogue, in which much attention was given to magnitudes, appear to certify the variability of light.

Piazzi I. 4, 16 Leonis Min., and 32 Vulpeculæ, one of Gilliss's suspected stars, also deserve attention, and observations of χ (Bayer) Cygni are especially desirable, great perturbations having been exhibited in the times of maxima of late years, which, with others previously indicated, it has not yet been found possible to represent satisfactorily by any formula. The variable is the true χ Cygni, Flamsteed having affixed this letter to his No. 17 in this constellation; the cause of it is now understood, Bayer's χ having been faint at the dates of Flamsteed's observations. The var. has (1875·0) R.A. 19h. 45m. 46s., N.P.D. 57° 24′.

Prof. Schönfeld, in his new catalogue, enters the Rev. T. W. Webb's variable in Orion, as *S* Orionis, and places it (for 1855) in R.A. 5h. 21m. 51s., and N.P.D. 94° 48′·7. As a first rough approximation to elements, he fixes a minimum to the beginning of December 1872, and assigns a period of from thirteen to thirteen-and-a-half months, the limits of variation 8·3 to less than 12·3.

OCCULTATION OF ANTARES, 1819, April 13.—We refer to this occultation on account of an interesting observation made by Burg at Vienna. He records the emersion on the dark limb of the moon at 12h. 3m. 22s. or 23s. apparent time, but remarks that at 12h. 3m. 17s·1 he noted the emergence of a star of from sixth to seventh magnitude, which after nearly five seconds suddenly appeared as a star of the first magnitude; and, writing to Bode, he suggests that Antares might be a double star, with the companion so close to the principal star, that good telescopes had not shown it. Bode's explanation was not a happy one. In a note he remarks: "Antares is no double star," and he goes on to attribute the phenomenon witnessed by Burg to the intervention of a lunar atmosphere. The Vienna observation, however, proves that the small star was then separated from the large one by a measurable quantity. It may be remembered that at the emersion of Antares in the occultation of 1856, March 26, which was observed by the late Rev. W. R. Dawes, at Wateringbury, and Mr. Whitbread, F.R.S., at Cardington, both observers noted the interval between the appearance of the small blue star and its bright neighbour as seven seconds; the difference of colour was very marked on this occasion; Burg does not refer to it. Occultations of Antares are coming on again, but no one of them is visible in this country up to the end of the year 1878.

ENCKE'S COMET.—From M. Stéphan's observations at Marseilles on January 27 and 29, published in M. Leverrier's *Bulletin International* of the 11th inst., it appears that Dr. von Asten's ephemeris gives the comet's place with great precision; indeed, the error on the 29th (the best observation) was less than fifteen seconds of arc. M. Stéphan remarks:—"La comète offre l'apparence d'une petite tache laiteuse, à peine perceptible, produisant sur la rétine plutôt des pulsations intermittentes qu'une sensation continue." We are able to add, that on the 31st ult. it was the *extremum visibile* with a 7-inch refractor. The following positions are for 8 P.M. Greenwich time:—

		R.A.		N.P.D.		DISTANCE
	h.	m.	s.	°	′	from the Earth.
Feb. 21	0	10	25	81	5·3	1·818
,, 23	0	14	33	80	41·0	1·798
,, 25	0	18	49	80	16·1	1·776
,, 27	0	23	13	79	50·7	1·754
March 1	0	27	45	79	24·7	1·730
,, 3	0	32	26	78	58·2	1·705
,, 5	0	37	16	78	31·1	1·678

WINNECKE'S COMET.—Prof. Oppölzer considered that the error of his predicted time of perihelion passage in the present year would probably not exceed two hours. We find, on comparing the Marseilles observation on the morning of the 2nd inst. with his elements, that the error is likely to be within this limit, or about $0^{d}{\cdot}0764$, the predicted time too late. With this correction the error in geocentric longitude disappears, and that in latitude is very trifling.

MR. HAMILTON'S STRING ORGAN

IN the *Philosophical Magazine* for February there is a paper by Mr. R. Bosanquet on the mathematical theory of this instrument, in which, however, as it appears to me, the principal points of interest are not touched upon. As the remarks that I have to offer will not require any analysis for their elucidation, I venture to send them to NATURE as more likely than in the *Philosophical Magazine* to meet the eyes of those interested.

The origin of the instrument has led, as I cannot but think, to considerable misconception as to its real acoustical character. The object of Mr. Hamilton and his predecessors was to combine the musical qualities of a string with the sustained sound of the organ and harmonium. This they sought to effect by the attachment of

© 1875 Nature Publishing Group